

Attorney Docket No.: SP03-079

Serial No.: 10/611,507

Filed: June 30, 2003

Group Art Unit: 1745

Examiner: Keith D. Walker

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The listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. **(Withdrawn)** An electrolyte sheet, said electrolyte sheet comprising a substantially non-porous body of a varied thickness, said electrolyte sheet having a textured surface with multiple indentations therein, wherein thickest part of said electrolyte sheet is at least 0.5 micrometers greater than the thinnest part of said electrolyte sheet.
2. **(Withdrawn)** The electrolyte sheet of claim 1, wherein the electrolyte sheet is a ceramic sheet formed of a polycrystalline ceramic selected from a group consisting of partially stabilized zirconia or stabilized zirconia, and being doped with a dopant selected from the group consisting of the oxides of Y, Ce, Ca, Mg, Sc, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, In, Ti, Sn, Nb, Ta, Mo, W and mixtures thereof.
3. **(Withdrawn)** The electrolyte sheet of claim 1, wherein the thickest part of said sheet is at least 2 micrometers greater than the thinnest part of said sheet.
4. **(Withdrawn)** The electrolyte sheet of claim 1, wherein the thickest part of said sheet is at least 2 to 10 micrometers greater than the thinnest part of said sheet.
5. **(Withdrawn)** The electrolyte sheet of claim 1, wherein said electrolyte sheet has an average thickness greater than 5 micrometers and less than 100 micrometers.
6. **(Withdrawn)** The electrolyte sheet of claim 1, wherein said average thickness is below 45 micrometers.
7. **(Withdrawn)** The electrolyte sheet of claim 1, wherein said average thickness is below 20 micrometers.
8. **(Withdrawn)** The electrolyte sheet of claim 1, wherein said average thickness is between 5 and 18 micrometers.

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9. **(Withdrawn)** The electrolyte sheet of claim 1, wherein said textured surface has periodically arranged indentations.

10. **(Currently Amended)** A solid oxide electrode/electrolyte assembly comprising:

    a thin electrolyte sheet of varied thickness of an average electrolyte sheet thickness between 3 micrometers and 30 micrometers;

    at least one cathode disposed on a first surface of said electrolyte sheet;

    at least one anode disposed opposite the cathode on a second surface of said electrolyte sheet;

    wherein said electrolyte sheet is bendable to an effective radius of curvature of less than 20 cm, has a surface with a pre-determined re-producible pattern and a thickness variation of at least 2 micrometers and its thickness variation is 6.6% to 90% of the average electrolyte sheet thickness, and

    wherein at least 50% of the area of the electrolyte sheet situated under said at least one cathode and said at least anode has a thinner body than the rest of the electrolyte sheet situated under said at least one cathode and said at least anode.

11. **(Original)** An electrode/electrolyte assembly according to claim 10, wherein the electrolyte sheet is a ceramic sheet formed of a polycrystalline ceramic selected from a group consisting of partially stabilized zirconia or stabilized zirconia, and being doped with a dopant selected from the group consisting of the oxides of Y, Ce, Ca, Mg, Sc, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, In, Ti, Sn, Nb, Ta, Mo, W and mixtures thereof.

12. **(Previously Presented)** An electrode/electrolyte assembly according to claim 11, wherein said average electrolyte sheet thickness is between 4 and 20 micrometers and the thickness variation is at least 10% of the average electrolyte sheet thickness.

13. **(Original)** An electrode/electrolyte assembly according to claim 12, wherein said average electrolyte sheet thickness is between 4 and 15 micrometers.

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14. **(Original)** An electrode/electrolyte assembly according to claim 13, wherein said average electrolyte sheet thickness is between 8 and 15 micrometers.

15. **(Previously Presented)** An electrode/electrolyte assembly according to claim 12, wherein said thickness variation 2 to 10 micrometers.

16. **(Cancelled)**

17. **(Withdrawn)** A method of making an electrolyte sheet, said method comprising the steps of:

(a) providing a textured green pre-ceramic sheet with at least 0.5 micrometer variations in its thickness;

(b) sintering the textured, green pre-ceramic sheet to provide an electrolyte sheet with substantially non-porous body, the non porous body having a textured surface with multiple indentations therein, wherein the thickest part of the electrolyte sheet is at least 0.5 micrometers greater than the thinnest part of the electrolyte sheet.

18. **(Withdrawn)** The method according to claim 17, wherein the green sheet and the resulting electrolyte sheet have thickness variation of at least 2 micrometers.

19. **(Withdrawn)** The method of claim 17, wherein said step of providing said textured green pre-ceramic sheet includes placing ceramic slip on a textured surface.

20. **(Withdrawn)** The method of claim 17, wherein said step of providing said textured green pre-ceramic sheet includes texturing said green pre-ceramic sheet with at least one textured roller.

21. **(Withdrawn)** The method of claim 17 wherein said green pre-ceramic sheet is squeezed between two rollers.

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22. **(Withdrawn)** The method of claim 17 further including a step of removing green-pre-ceramic material from higher areas of the green pre-ceramic sheet.

23. **(Currently Amended)** A solid oxide electrode/electrolyte assembly comprising:

a thin solid oxide electrolyte sheet bendable to an effective radius of curvature of less than 20 cm, said electrolyte sheet being of varied thickness of an average electrolyte sheet thickness between 3 micrometers and 30 micrometers and thickness variation of at least 0.5 micrometers and ohmic resistance of no more than 0.5 ohm-cm<sup>2</sup>;

at least one cathode disposed on a first surface of said electrolyte sheet; and  
at least one anode disposed opposite the cathode on a second surface of said electrolyte sheet wherein there are multiple thinner electrolyte sheet areas under said at least one cathode and said at least one anode, wherein at least 75% of the area of the electrolyte sheet situated under said at least one cathode and said at least one anode has a thinner body than the rest of the electrolyte sheet situated under said at least one cathode and said at least one anode.

24. **(Previously Presented)** The solid oxide electrode/electrolyte assembly according to claim 23 wherein said electrolyte sheet has a textured surface with multiple indentations.

25. **(Previously Presented)** The solid oxide electrode/electrolyte assembly according to claim 10 wherein said electrolyte sheet has a textured surface with multiple indentations.

26. **(New)** The fuel cell device according to claim 10, wherein thinner areas of said electrolyte sheet are textured.